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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/705,395	11/02/2000	Jonathan S. Turner	52186	3173

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THE LAW OFFICE OF KIRK D. WILLIAMS  
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EXAMINER

JAGANNATHAN, MELANIE

ART UNIT	PAPER NUMBER
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2666

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/705,395

Applicant(s)

TURNER ET AL.

Examiner

Melanie Jagannathan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,9,10,12-15 and 25-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,9,10,12-15 and 25-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

- A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/3/2005 has been entered.
- Claims 1, 9-10, 12-15, and 25-41 are pending.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 14 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites the limitation "said transmit lists" in line 10. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 9-10, 12-15, 25-29, 36-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Delp et al. US 6,477,168.

Regarding claims 1, 10, 26, the claimed inserting an entry into one a plurality of timing wheels and removing entry from one of plurality of timing wheels at an appropriate time corresponding to a position of entry in the plurality of timing wheels is disclosed by fast timing wheel used for smaller ranges of time (Figure 4, element 400) and slow timing wheel (element 402) with timing wheel comprising an array of pointers to the data structure logical channel descriptor (Figure 2A, element 206) which includes next LCD pointer for linking LCDs together at a timing wheel slot and pointers to a chain of cells/packets to be transmitted. Cell/frame scheduler scans timing wheel and if find LCD for connection on timing wheel within time range for that timing wheel, then cell/frame scheduler sends out cell/frame and computes next time this LCD has to be enqueued on timing wheel (elements 400 or 402) which teaches idea of removing entry from timing wheel at appropriate time. See column 5, lines 23-67, column 6, lines 4-66.

The claimed placing entry into transmit list in response to removing entry from timing wheel is disclosed by cell/frame scheduler scanning enqueued LCD on timing wheel which contains pointer for cell/frame scheduler to locate entry in chain of LCDs (transmit list). See column Figure 3 and column 5, lines 23-44. The claimed transmit list distinct from data structures of plurality of timing wheels identifying timing positions

within the plurality of timing wheels is disclosed by the LCD (Figure 2A, element 206) is a separate data structure from timing wheels which describes data stream cell queue including a next LCD pointer for linking LCDs together at a timing wheel time slot. LCD includes scheduling information for corresponding data stream queue such as scheduling parameters (element 214), scheduling state (element 216) and timing wheel selector (element 218). See column 4, lines 62-67, column 5, lines 1-6. The claimed transmit list is configured for maintaining a plurality of entries removed from timing wheels is disclosed by pointer to LCD removed from timing wheel is used to locate corresponding LCD which holds a next LCD pointer that can be used to point to the next LCD stored in the same slot in the timing wheel. See column 24-30, lines 35-44. Examiner believes Delp et al. teaches entries removed from timing wheels with as cell/frame scheduler uses algorithm which checks if LCD in timing wheel is enqueued within a certain time frame for transmission for cell/frame and computes next time this LCD has to be enqueued on timing wheel.

The claimed in response to identifying the entry is next entry to process from transmit list, removing entry from transmit list and in response to entry being removed from list, sending information corresponding to entry is disclosed by cell/frame scheduler passes LCD to transmission preparation logic (Figure 2, element 208) for cell/frame transmission corresponding to that LCD and the next LCD pointer is cleared in this LCD. See column 6, lines 20-44. The claimed determining a next target time and re-inserting the entry removed from transmit list into plurality of timing wheels based on next target time is disclosed by next target transmission time calculated for a

frame/cell, selecting a timing wheel (fast or slow) and pointer address written in for that LCD. See column 6, lines 4-44.

Regarding claim 9, the claimed two timing wheels having different time granularities is disclosed by fast and slow timing wheels (Figure 4, element 400, 402) and column 5, lines 45-53.

Regarding claim 25, the claimed transmit list includes at least one other entry removed from a particular one of the plurality of timing wheels when removing the entry from transmit list is performed is disclosed by Delp et al. discloses fast and slow timing wheel where entries in timing wheels are removed according to its own range of time so as transmission of cell is performed at transmission preparation logic (element 208) causing removal of entry from chain of LCDs, another entry for connection could be removed from other timing wheel for transmission. See column 5, lines 23-67, column 6, lines 20-44.

Regarding claim 27, the claimed selecting one of plurality of timing wheels prior to inserting entry based on wheel having finest granularity and whose range includes target time of entry regardless of rate corresponding to entry is disclosed by fast and slow timing wheels (Figure 4, elements 400, 402). Fast timing wheel used for smaller ranges of time, slow timing wheel used to larger and some LCDs with target transmission time greater than time for slow timing wheel than sent to fast timing wheel. See Figure 4 and column 5, lines 45-52.

Regarding claims 36, 38, 40, the claimed means for inserting an entry into one a plurality of timing wheels and means for removing entry from one of plurality of timing

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wheels at an appropriate time corresponding to a position of entry in the plurality of timing wheels is disclosed by fast timing wheel used for smaller ranges of time (Figure 4, element 400) and slow timing wheel (element 402) with timing wheel comprising an array of pointers to the data structure logical channel descriptor (Figure 2A, element 206) which includes next LCD pointer for linking LCDs together at a timing wheel slot and pointers to a chain of cells/packets to be transmitted. Cell/frame scheduler scans timing wheel and if find LCD for connection on timing wheel within time range for that timing wheel, then cell/frame scheduler sends out cell/frame and computes next time this LCD has to be enqueued on timing wheel (elements 400 or 402) which teaches idea of removing entry from timing wheel at appropriate time. See column 5, lines 23-67, column 6, lines 4-66.

The claimed means for placing entry into transmit list in response to removing entry from timing wheel is disclosed by cell/frame scheduler scanning enqueued LCD on timing wheel which contains pointer for cell/frame scheduler to locate entry in chain of LCDs (transmit list). See column Figure 3 and column 5, lines 23-44. The claimed transmit list distinct from data structures of plurality of timing wheels identifying timing positions within the plurality of timing wheels is disclosed by the LCD (Figure 2A, element 206) is a separate data structure from timing wheels which describes data stream cell queue including a next LCD pointer for linking LCDs together at a timing wheel time slot. LCD includes scheduling information for corresponding data stream queue such as scheduling parameters (element 214), scheduling state (element 216) and timing wheel selector (element 218). See column 4, lines 62-67, column 5, lines 1-

6. The claimed transmit list is configured for maintaining a plurality of entries removed from timing wheels is disclosed by pointer to LCD removed from timing wheel is used to locate corresponding LCD which holds a next LCD pointer that can be used to point to the next LCD stored in the same slot in the timing wheel. See column 24-30, lines 35-44. Examiner believes Delp et al. teaches entries removed from timing wheels with as cell/frame scheduler uses algorithm which checks if LCD in timing wheel is enqueued within a certain time frame for transmission for cell/frame and computes next time this LCD has to be enqueued on timing wheel.

The claimed in response to identifying the entry is next entry to process from transmit list, removing entry from transmit list and in response to entry being removed from list, sending information corresponding to entry is disclosed by cell/frame scheduler passes LCD to transmission preparation logic (Figure 2, element 208) for cell/frame transmission corresponding to that LCD and the next LCD pointer is cleared in this LCD. See column 6, lines 20-44. The claimed determining a next target time and re-inserting the entry removed from transmit list into plurality of timing wheels based on next target time is disclosed by next target transmission time calculated for a frame/cell, selecting a timing wheel (fast or slow) and pointer address written in for that LCD. See column 6, lines 4-44.

Regarding claim 37, the claimed two timing wheels having different time granularities is disclosed by fast and slow timing wheels (Figure 4, element 400, 402) and column 5, lines 45-53.



Regarding claim 39, the claimed transmit list includes at least one other entry removed from a particular one of the plurality of timing wheels when removing the entry from transmit list is performed is disclosed by fast and slow timing wheel where entries in timing wheels are removed according to its own range of time so as transmission of cell is performed at transmission preparation logic (element 208) causing removal of entry from chain of LCDs, another entry for connection could be removed from other timing wheel for transmission. See column 5, lines 23-67, column 6, lines 20-44.

Regarding claim 41, the claimed selecting one of plurality of timing wheels prior to inserting entry based on wheel having finest granularity and whose range includes target time of entry regardless of rate corresponding to entry is disclosed by fast and slow timing wheels (Figure 4, elements 400, 402). Fast timing wheel used for smaller ranges of time, slow timing wheel used to larger and some LCDs with target transmission time greater than time for slow timing wheel than sent to fast timing wheel. See Figure 4 and column 5, lines 45-52.

Regarding claim 12, the claimed maintaining a plurality of timing wheels is disclosed by cell/frame scheduler made up of at least one timing wheel. See column 5, lines 24-26. The claimed inserting the first pacing identifier into the plurality of timing wheels at a position corresponding to a first sending time to send a packet from the first stream is disclosed by timing wheels comprise an array of pointers to the data structure logical channel descriptor (Figure 2A, element 206) which includes next LCD pointer for linking LCDs together at a timing wheel slot and pointers to a chain of cells/packets to be transmitted. Cell/frame scheduler scans timing wheel and if find LCD for connection

on timing wheel within time range for that timing wheel, then cell/frame scheduler sends out cell/frame and computes next time this LCD has to be enqueued on timing wheel (elements 400 or 402). See column 5, lines 23-67, column 6, lines 4-66.

The claimed inserting the second pacing identifier into the plurality of timing wheels at a position corresponding to a second sending time to send a packet from the second stream is disclosed by timing wheels comprise an array of pointers to the data structure logical channel descriptor (Figure 2A, element 206) which includes next LCD pointer for linking LCDs together at a timing wheel slot and pointers to a chain of cells/packets to be transmitted. Cell/frame scheduler scans timing wheel and if find LCD for connection on timing wheel within time range for that timing wheel, then cell/frame scheduler sends out cell/frame and computes next time this LCD has to be enqueued on timing wheel (elements 400 or 402) which teaches idea of removing entry from timing wheel at appropriate time. See column 5, lines 23-67, column 6, lines 4-66.

The claimed sequencing through the plurality of timing wheels at a plurality of predetermined rates wherein at approximately the first/second sending time removing the first/second pacing identifier from the plurality of timing wheels and inserting the first/second pacing rate identifier into a transmit list is disclosed by cell/frame scheduler keeps track of current time and other variables and uses these to scan timing wheels and if find LCD for connection on timing wheel within time range for that timing wheel, then cell/frame scheduler sends out cell/frame and computes next time this LCD has to be enqueued on timing wheel (elements 400 or 402). See column 5, lines 54-67, column 6, lines 1-12.

The claimed transmit list distinct from data structures of plurality of timing wheels identifying timing positions within the plurality of timing wheels is disclosed by the LCD (Figure 2A, element 206) is a separate data structure from timing wheels which describes data stream cell queue including a next LCD pointer for linking LCDs together at a timing wheel time slot. LCD includes scheduling information for corresponding data stream queue such as scheduling parameters (element 214), scheduling state (element 216) and timing wheel selector (element 218). See column 4, lines 62-67, column 5, lines 1-6.

The claimed transmit list is configured for maintaining a plurality of identifiers removed from timing wheels is disclosed by pointer to LCD removed from timing wheel is used to locate corresponding LCD which holds a next LCD pointer that can be used to point to the next LCD stored in the same slot in the timing wheel. See column 24-30, lines 35-44. Examiner believes Delp et al. teaches entries removed from timing wheels with as cell/frame scheduler uses algorithm which checks if LCD in timing wheel is enqueued within a certain time frame for transmission for cell/frame and computes next time this LCD has to be enqueued on timing wheel.

The claimed in response to identifying the first/second pacing rate identifier, added to transmit list by inserting first/second pacing rate identifier into transmit list operation, is the next identifier to process from transmit list, removing entry from transmit list and in response to entry being removed from list, sending information corresponding to entry is disclosed by cell/frame scheduler passes LCD to transmission preparation logic (Figure 2, element 208) for cell/frame transmission corresponding to

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that LCD and the next LCD pointer is cleared in this LCD. See column 6, lines 20-44.

The claimed re-inserting the entry removed from transmit list into plurality of timing wheels based on next target time is disclosed by next target transmission time calculated for a frame/cell, selecting a timing wheel (fast or slow) and pointer address written in for that LCD. See column 6, lines 4-44.

Regarding claim 13, the claimed first pacing rate identifier inserted into transmit list before second pacing rate identifier, second pacing rate identifier removed before first pacing rate identifier is disclosed by three tier timing wheel (Figure 9, element 102) including a leaky bucket timing wheel having highest priority (element 902), middle priority timing wheel (element 904) and a best effort timing wheel (element 906) so packets are sent according to priority level. See column 8, lines 13-25.

Regarding claim 15, the first wheel having a finer timing granularity than second and items are removed from second transmit list only if first is empty is disclosed by priority timing wheels and check is made if cell is ready for transmission in highest priority timing wheel, if not, then checking middle priority etc. See column 8, lines 58-67, column 9, lines 1-22.

Regarding claim 28-29, the claimed each timing wheel used to schedule information of same priority level is disclosed by disclosed by three tier timing wheel (Figure 9, element 102) including a leaky bucket timing wheel having highest priority (element 902), middle priority timing wheel (element 904) and a best effort timing wheel (element 906) so packets are sent according to priority level. See column 8, lines 13-

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25. A check is made if cell is ready for transmission in highest priority timing wheel, if not, then checking middle priority etc. See column 8, lines 58-67, column 9, lines 1-22.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delp et al.

Claims 30-35 mirror claims 1, 9-10 and rejection for these claims follows same rationale as above for claims 1, 9-10. However, Delp et al. does not disclose one or more computer-readable media containing computer-executable steps for pacing flow of

information from device. At the time the invention was made it would have been obvious to translate steps into code to pace flow of information. One of ordinary skill in the art would be motivated to do this for the efficiency due to an automated system.

### ***Response to Arguments***

2. Applicant's arguments 10/3/2005 have been considered but are moot in view of the new ground(s) of rejection. Examiner appreciates filing of RCE to further prosecution and Examiner will work with Applicant in good faith as well to come to a resolution on case. Additionally, Examiner appreciates detailed description of prior art.

Applicant argues reference Delp et al. does not disclose transmit lists used in conjunction with timing wheels as claimed in application. Examiner understands Applicant's argument, but in light of the claim language, Examiner respectfully disagrees. The claimed transmit list is distinct from data structures of timing wheels, identifying timing positions within the timing wheels is disclosed by Delp et al. with LCDs that are separate from the timing wheels and include pointer to link LCDs together at a timing wheel slot. Examiner believes the claimed transmit list configured to maintain a plurality of entries/identifiers removed from timing wheels is taught by if the LCD pointer is enqueued at appropriate time on timing wheel, it is used in accordance with LCD to schedule/transmit cells from queue and then LCD pointer is enqueued at a later time.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Jagannathan whose telephone number is 571-272-3163. The examiner can normally be reached on Monday-Friday from 8:00 a.m.-4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ  
12/23/2005



DANG TON  
PRIMARY EXAMINER